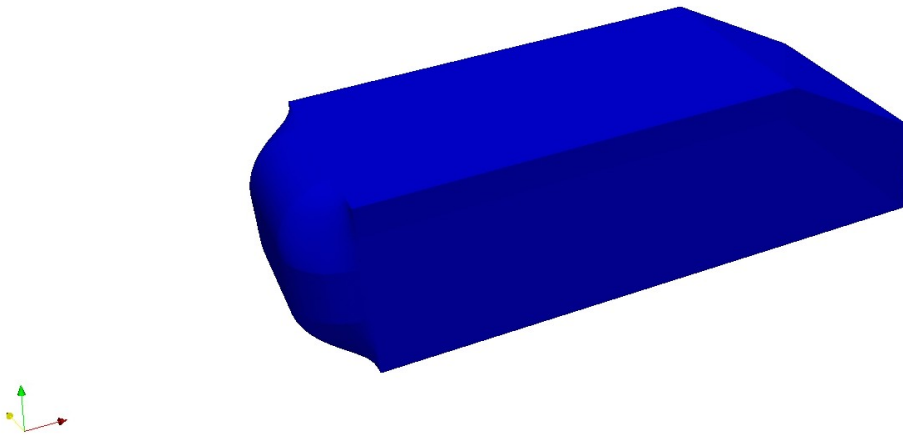


# ABSTRACT

This report aims to describe the calculation of turbulent flow field around a simple car-like geometry (Ahmed Body Geometry) using the software Gmsh and OpenFOAM. It also aims to compare the aerodynamic efficiency of Ahmed Body with ruled frontal surfaces to that with plane frontal surfaces. Ahmed Body represents a simplified, ground vehicle geometry of a bluff body type. The Ahmed Body allows for accurate flow simulation through its simple enough shape. It also retains some important practical features relevant to automobile bodies.

## PROBLEM STATEMENT

For a **steady state turbulent flow**, analyze the airflow over Ahmed Body geometry (Figure 1) (Use the internet for dimensions). Use a suitable turbulence model. Calculate the aerodynamic coefficients as well. Now replace the frontal ruled surfaces of the geometry with plane surfaces and compare the aerodynamic efficiency of the two geometries of Ahmed Body.



**Figure 1**

Following are the initial conditions that you will need to solve the problem:

$p(\text{internal field}) = 1 \text{ atm}$ ;

freestream velocity,  $V = 40 \text{ m/s}$ ;

Density =  $1.225 \text{ kg/m}^3$ ;

$\nu = 1.5 \times 10^{-5}$ ;

Include plots and pictures in the report wherever necessary.